RECEIVED
CENTRAL FAX CENTER
APR 07 2006

FAX COVER SHEET

PLEASE CONFIRM RECEIPT OF THIS FACSIMILE

Attention: Group Art Unit: 2681
Examiner: David Q. Nguyen
Supervisory Examiner: Joseph H. Field
UNITED STATES PATENT AND TRADEMARK OFFICE

Fax: (571) 273-8300
Phone: (571) 272-7844
Alt: (571) 272-4090

Pages: Cover + 19 =20

Date: April 7, 2006

From: Georgann S. Grunebach
Assistant General Counsel, DIRECTV

Fax: (310) 964-0941
Phone: (310) 964-4615

Certificate of Transmission under 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to (571) 273-8300 (Centralized Facsimile Number), addressed to Mail Stop Appeal-Brief Patents, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on April 7, 2006.

Date: April 7, 2006

Georgann S. Grunebach, Reg. No. 33,179

Attention: Commissioner for Patents

Attorney Docket No. PD-990213

Please find attached Re: 09/536,275

> APPEAL BRIEF (19 pages)

PLEASE CONFIRM RECEIPT OF THIS FACSIMILE

If you do not receive all pages, or pages are not clear, please call Karen Lum at (310) 964-0735.

RECEIVED
CENTRAL FAX CENTER
APR 07 2006

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 CFR 1.8

I hereby certify that this correspondence is being facsimile transmitted to 571-273-8300 (Centralized Facsimile Number), addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450, on April 7, 2006 (date of facsimile transmission) by Georgann S. Grunebach (Name of Appellant, Assignee or Registered Representative)

(Signature) April 7, 2006 (Date of Signature)

Georgann S. Grunebach, Registration No. 33,179

Customer Number 020991

Patent
PD-990213

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:

Arthur W. Wang

Serial No: 09/536,275 Group Art Unit: 2681

Filed: 03/27/2000 Examiner: Nguyen, David Q.

For: SATELLITE COMMUNICATION SYSTEM

BRIEF ON APPEAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following Appeal Brief is submitted in response to the Notice of Appeal filed February 16, 2005.

04/10/2006 TL0111 00000054 500383 09536275
01 FC:1402 500.00 DA

I. Real Party in Interest

The real party in interest in this matter is The DIRECTV Group, Inc of El Segundo, California which is 34 percent owned by Fox Entertainment Group, which is approximately 82 percent owned by The News Corporation, Limited.

II. Related Appeals and Interferences

There are no other known appeals or interferences which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of the Claims

Claims 1-34 are pending in the application. Claims 22 and 24 are withdrawn.

IV. Status of Amendments

There have been no amendments filed subsequent to the Final Action mailed November 16, 2005.

V. Summary of Claimed Subject Matter

The present application is generally directed to a communication system 40 that is best illustrated in Figure 3. The common feature that is presented throughout the claims is that the satellites generate a plurality of beams with variable beam widths to provide a substantially uniform cell size. The variable beam width is desirable to maintain the cell size because the satellites are in an elliptical sub-geosynchronous orbit and therefore their positions move relative to the Earth. By maintaining the size at the cell size at the ground by changing the beam width, a uniform predicable system is formed.

Claim 1 is directed to a communications system 40 that includes a plurality of regional ground stations and a plurality of satellites 42a, 42b, 44a, 44b located in an elliptical sub-geosynchronous orbit 32 with respect to the earth. The orbit 32 is best illustrated in Figure 2, which is described on Page 9, line 14-page 10, line 15. The

satellites operate in a service area in a synchronized manner to provide continuous coverage to the service area. The satellites 42a, 42b, 44a, 44b generate a plurality of beams with widths that vary relative to position in the orbit to provide a substantially uniform cell size 48, 52 covering the service area, Figure 16, page 20, lines 13-17. The system further includes a plurality of user terminals within the service area receiving communication signals from the satellite.

Claim 2 recites that the ground station is coupled to one selected from the group consisting of internet service provider, television center 60, and a corporate internet 62. This is discussed on page 12, lines 12-13.

Claim 3 recites that the uniform cells are substantially fixed within the service area. This is described in page 30, line 20.

Claim 4 recites that the plurality of beams provides equal capacity density to the cell size as set forth in line 22 of page 20.

Claim 5 recites that the sub-geosynchronous orbit has a minimum elevation angle greater than 10 degrees in the service area as set forth on page 16, line 11.

Claim 6 recites that the service area is a primary market, page 18, line 26.

Claim 7 recites that the satellites comprise a phased array to form the plurality of beams, page 12, line 22.

Claim 8 recites that the first plurality of satellites are disabled when coextensive with a geostationary orbit. This insures that no interference exists between the two systems, Figure 18, page 21, lines 1-12.

Claim 9 recites that the plurality of satellites is less than 9, Figure 4, page 13, line 4.

Claim 10 recites that the plurality of satellites is 4, page 16, line 3.

Claim 11 recites that the plurality of satellites is 5, page 16, line 3.

Claim 12 is another independent claim directed to a communications system 40. Claim 12 specifically recites a first plurality of satellites 42a, 42b and a second plurality of satellites 44a, 44b, page 12, lines 16-26. The first plurality of satellites are located in a

sub-geosynchronous orbit and have similar limitations with respect to the elliptical sub-geosynchronous orbit and beams with widths that vary relative to position in the orbit to obtain a substantially uniform cell size covering the service area. The first plurality of satellites provide a system capacity. The second plurality of satellites are deployed after the first plurality of satellites and provide a second system capacity greater than the first system capacity.

Claim 13 corresponds to Claim 3, Claim 14 corresponds to Claim 4, Claim 15 corresponds to Claim 5, Claim 16 corresponds to Claim 6, Claim 17 corresponds to Claim 7, Claim 18 corresponds to Claim 8, Claim 19 corresponds to Claim 9, Claim 20 corresponds to Claim 10, and Claim 21 corresponds to Claim 11.

Claim 22 is an independent method claim having similar limitations to Claim 1 with respect to the inclined sub-geosynchronous satellite orbit and bearing the beamwidth so the beam generated during operation in an active arc of an orbit. Claim 22 specifically recites the steps of handing over an operation from a first satellite to a second satellite to maintain at least the minimum elevation angle and operating the satellite to generate the plurality of fixed cells by varying the beamwidth of the beams generated during the operation in an active arc of the orbit, page 13, line 21 – page 14, line 5.

Claim 23 specifically recites that the orbit is an inclined eccentric sub-geosynchronous orbit, page 9, lines 10-11.

Claim 24 has been withdrawn.

Claim 25 is also an independent method claim directed to developing a satellite constellation having a first set of satellites located in an elliptical sub-geosynchronous orbit so that the satellites operate in a synchronized manner to provide continuous coverage to the service area. The satellites generate a plurality of beams with variable beamwidth formed as a function of the orbit position to obtain substantially uniform cell size covering the service area. The second set of satellites form a second satellite constellation having primary market coverage in cooperation with the first set of satellites

to have a service area greater than the first service area. This is similar to that of Claim 12 but in method form, page 13, line 21 – page 14, line 5.

Claim 26 recites launching a third set of satellites to form optimized landmass coverage to cooperate with the first set of satellites and the second set of satellites. The third service area is greater than the second service area, page 14, lines 22-24.

Claim 27 specifically recites first constellation, second constellation and third constellation comprise SGSO satellites, page 16, lines 7-9.

Claims 28 and 29 recite, respectively, that the first set of satellites and the second set of satellites do not interfere with GSO satellites, page 16, lines 21-24.

Claim 30 recites that the satellites and the second set of satellites have active arc size to provide continuous coverage to the second service area, page 16, lines 10-14.

Claim 31 recites that the first and second set of satellites have active arcs to be non-interfering with GSO satellites, page 16, lines 21-24.

Claim 32 is also an independent claim and recites a plurality of regional ground stations 54 and plurality of satellites 42a, 42b, 44a, 44b located in an elliptical sub-geosynchronous orbit 32 with respect to the earth, Figure 2, page 9, line 14 – page 10, line 15. The satellites operate in a service area in a synchronized manner to provide continuous coverage to the service area. The satellites generate a plurality of beams with variable beamwidths that vary as a function of orbital position to obtain a substantially uniform cell size covering the service area and plurality of user terminals with the service area receiving communication signals from the satellite.

Claim 33 recites that the plurality of satellites operate using a frequency of the GSO satellite, Figure 18, page 21, lines 1-12.

Claim 34 recites that the plurality of satellites do not operate in the GSO satellite avoidance zone, Figure 18, page 21, lines 4-6.

VI. Grounds of Rejection to be Reviewed on Appeal

The following issues are presented in this appeal:

Whether Claims 1, 3, 6, 7, 9-13,17, 19-21, 23, 25-33 are unpatentable under 35 U.S.C. §103(a) over *Castiel* (2002/0160710) in view of *Porcelli (6,333,924)*.

Whether Claims 4-5 and 14-15 are obvious under 35 U.S.C. §103(a) over *Castiel* (2002/0160710) in view of *Porcelli (6,333,924)* in further view of *Taormina* (6,257,526).

Whether Claims 8 and 18 are obvious under 35 U.S.C. §103(a) over *Castiel* (2002/0160710) in view of *Porcelli (6,333,924)* in further view of *Schloemer* (RE37140).

Whether Claim 2 is unpatentable under 35 U.S.C. §103(a) over *Castiel* (2002/0160710) in view of *Porcelli (6,333,924)* in further view of *Byrne* (4,990,883).

Whether Claim 16 is unpatentable under 35 U.S.C. §103(a) over *Castiel* (2002/0160710) in view of *Porcelli (6,333,924)* in further view of *Wainfan* (6,339,707).

VII. Argument

The Rejection of Claims 1, 3, 6, 7, 9-13,17, 19-21, 23, 25-33 under 35 U.S.C. §103(a)

Claim 1

The *Castiel* reference is directed to a communications system that admittedly includes elliptical sub-geosynchronous orbits that provide coverage to a service area. The Examiner admits that the *Castiel* reference does not disclose said satellite generating a plurality of beams with variable beam widths to obtain a substantially cell size covering the service area. The Examiner cites the *Porcelli* reference for this proposition.

The Examiner specifically points to Col. 16, lines 22-25, of the *Porcelli* reference for this teaching. This section is in Claim 20 and recites, "wherein each of said plurality of satellites comprises a phased array antenna operative to change said satellite's overall beam pattern in response to commands based on the location of said satellite in orbit." This claim does mention changing the beam pattern based upon the location of the satellite in orbit. However, no teaching or suggestion is provided in this passage for generating a plurality of beams with widths that vary relative to position in the orbit to

obtain a substantially **uniform** cell size covering the said service area. In Col. 10, lines 42-53, the recognition of beam changing sizes relative to the ground is specifically set forth. Line 49 states, "Specifically, when the satellite is at its highest altitude the satellite beam will provide the maximum coverage on the ground, when the satellite is at its lowest altitude, the beam coverage will be minimum." However, Col. 11, lines 1-40 specifically recite adjusting the phase of the RF signal to each element of the phased array antenna to change the beam pattern. Thus, the beam pattern itself is changed rather than generating a plurality of beams with widths that vary relative to position in the orbit to obtain substantially uniform cell size covering said service area. In fact, Appellant has found no teaching or suggestion for obtaining a substantially uniform cell size within the *Porcelli* reference. Also, the *Porcelli* reference does not teach or suggest changing the beam widths. In fact, the passage set forth above implies that the beam width from the satellite is maintained in size. As the satellite moves the ground pattern decreases as the satellite gets closer. This can be demonstrated by holding a flashlight in the dark different distances from a floor. The beam is the same with from the flashlight but the size of the spot increases as the distance from the floor increases. Column 11 merely recites beam pattern changes rather than changing the beam widths themselves. Therefore, Appellant respectfully requests the Board to reverse the rejection of Claim 1.

Claim 12

Claim 12 is also believed to be allowable for the same reasons set forth above. Claim 12 also recites the plurality of satellites are located in an elliptical sub-geosynchronous orbit and have variable beamwidths that vary relative to position in the orbit. Claim 12 also includes a further limitation that is not illustrated in the *Castiel* reference in that a second plurality of satellites are provided to generate a system capacity greater than the first capacity. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 12.

Claim 25

Claim 25 sets forth a method of developing a customized satellite constellation that includes similar limitations to that of Claim 1 in that an elliptical sub-geosynchronous orbit is established and that the first plurality of satellites includes variable beamwidths. Claim 25 also teaches launching a second set of satellites to form a second constellation with a second service area greater than the first area. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 25.

Claim 32

Claim 32 is a communications system that has a plurality of regional ground stations, a plurality of satellites located in elliptical sub-geosynchronous orbit with respect to the earth so that the satellites use beamwidths that vary the function of the orbital position to obtain substantially uniform cell size covering the service area. As mentioned above, the combination of satellites in elliptical sub-geosynchronous orbit and varying the beamwidths to maintain the cell size is not taught or suggested in either the *Castiel* reference or the *Porcelli* reference. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 32.

Claim 3

Claim 3 recites that the uniform cells are substantially fixed within the service area. This is not taught or suggested in the *Castiel* reference and therefore Appellant respectfully submits that this claim is also independently patentable.

Claim 6

Claim 6 recites that the service area is a primary market. No teaching or suggestion is provided in the *Castiel* reference for a primary market. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 6

Claim 7

Claim 7 recites that the plurality of satellites comprise a phased array antenna to form the plurality of beams. This in combination with the limitations set forth in Claim 1 are not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 7.

Claims 9-11

Claims 9-11 are independently patentable since they set forth that the plurality of satellites comprises less than 9, 4 satellites and 5 satellites. These limitations in combination with those of independent Claim 1 are not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claims 9-11 as well.

Claims 13, 17, 19-21

The claims dependent on Claim 12, namely 13, 17, 19-21 are allowable for the same reasons set forth above with respect to the dependent claims of Claim 1 since they correspond directly thereto.

Claim 23

Claim 23 is allowable since the satellite orbits are inclined eccentric sub-geosynchronous orbits. This in combination with the recitations of Claim 22 are not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 23.

Claim 26

Claim 26 specifically recites a third set of satellites are deployed that for a third service area greater than the second service area. Appellant respectfully submits that this

is not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 26.

Claim 27

Claim 27 recites that the three constellations comprise SGO satellites. This is not taught or suggested in combination with the recitations of Claim 25. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 27.

Claims 28 and 29

Claims 28 and 29 recite that the first set of satellites and second set of satellites, respectively, do not interfere with GSO satellites. No teaching or suggestion is provided for non-interfering satellites in the references, particularly in combination with the recitations of independent Claim 25. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claims 28 and 29.

Claim 30

Claim 30 recites that the satellites have active arc sized to provide continuous coverage to a second service area. The recitations of Claim 30 in combination with those of Claim 27 are not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 30.

Claim 31

Claim 31 recites that the first plurality of satellites and the second set of satellites have active arc sized to be non-interfering with GSO satellites. This claim is a combination of Claims 28 and 29. As mentioned above, the limitations of this claim are not taught or suggested in the references. Therefore, Claim 30 is independently patentable. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 31.

Claim 33

Claim 33 is dependent from Claim 32 and recites that the plurality of satellites operate using a frequency of a GSO satellite. This is not taught or suggested in the references and therefore the limitations of Claim 33 in combination with Claim 32 are not taught or suggested in the references. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 33.

The Rejection of Claims 4-5 and 14-15 Under 35 U.S.C. §103(1) as being unpatentable over *Castiel* in view of *Porcelli* in further view of *Taormina* (6,257,526).

Claims 4 and 14

Because the *Taormina* reference does not describe beam widths that vary relative to orbital position, the Appellant respectfully requests the Examiner to reconsider the rejection of Claims 4 and 5 and 14-15. Claims 4 and 14 specifically recite providing equal capacity to the plurality of beams.

The *Taormina* reference describes a first deployment of a plurality of satellites in a medium earth orbit and later deployments of pluralities of satellites in the medium earth orbit. If demand on the satellite constellation is increased further, more medium earth satellites may be deployed. However, if spacing between the MEO satellites becomes too small, the satellites may be deployed in an inclined orbit 38. (See for example Abstract and Col. 5, lines 24-40.) Although sub-geosynchronous orbits are described, the *Taormina* reference neither teaches nor suggests, for example, "a plurality of satellites located in an **elliptical** sub-geosynchronous orbit with respect to the earth, **said satellites operating in a service area in a synchronized manner to provide continuous coverage to said service area.**" Appellant agrees with the Examiner in his assessment in the last office action that variable beam widths to obtain a substantially uniform cell size is not shown in *Taormina*. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claims 4 and 14.

Claims 5 and 15

Claims 5 and 15 recite that the minimum elevation angle is above 15 degrees. This is also not shown in the references. Therefore, the Board is respectfully requested to reverse the Examiner's rejection of these claims as well.

The rejection of Claims 8 and 18 under 35 U.S.C. §103(a) as being unpatentable over *Castiel* in view of *Porcelli (6,333,924)* in view of *Schloemer* (RE37140).

Claims 8 and 18

Claims 8 and 18 recite disabling a satellite when it is coextensive with a geostationary orbit. Although the Examiner alleges that, "Schloemer discloses the satellites are disabled when coextensive with a geostationary orbit (see Col. 2, lines 45-50)", the *Schloemer* reference merely discusses satellites that accidentally end up in an improper orbit and ground control systems to insure that all satellite stay in correct orbits "and to disable a satellite when it is not in the proper grid orbit". This neither teaches nor suggests disabling a satellite when coextensive with a geostationary orbit, as would happen for example in a defined GSO Crossing Zone. Furthermore, it is respectfully submitted that Claims 8 and 18 are allowable over these references since the *Schloemer* reference does not cure the deficiencies of the teachings of the *Castiel* and *Porcelli* references as discussed earlier in connection with Claims 1 and 12 and therefore Claims 8 and 18 are allowable generally for the same reasons discussed in connection with Claims 1 and 12 and further due to the additional limitations recited therein. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claims 8 and 18.

The rejection of Claim 2 under 35 U.S.C. §103(a) as being unpatentable over *Castiel* in view of *Porcelli* in further view of *Byrne* (4,990,883).

Claim 2

Claim 2 recites that the ground stations are coupled to one of the internet service provider, television center and a corporate internet. Although various connections are

described in the *Byrne* reference fails to teach or suggest the limitations missing from the *Castiel* or *Porcelli* references. Namely, the *Byrne* reference does not teach or suggest beam widths that vary due to the position in orbit. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of this claim as well.

The rejection of Claim 16 under 35 U.S.C. §103(a) over *Castiel* in view of *Porcelli* in further view of *Wainfan* (6,339,707).

Claim 16 recites that the service area is a primary market area having an elevation greater than 30 degrees. Although an elevation angle greater than 30 degrees is set forth in the *Wainfan* reference, no teaching or suggestion is provided for a satellite constellation that has satellites that form a plurality of beams with beam widths that vary as a function of the position in the orbit. Appellant therefore respectfully requests the Board to reverse the Examiner's rejection of Claim 16.

Appellant notes that Claim 34 does not stand rejected. It is presumed that Claim 34 is allowable.

VIII. Claims Appendix

A copy of each of the claims involved in this appeal, namely Claims 1-21, 23, and 25-34 is attached as a Claims Appendix.

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

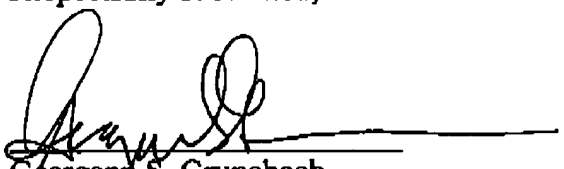
None.

XI. Conclusion

For the foregoing reasons, Appellants respectfully request that the Board direct the Examiner in charge of this examination to withdraw the rejections.

Please charge the amount of $500.00, the required fee for filing this Appeal Brief as set forth under 37 CFR §1.17(c) to Deposit Account No. 50-0383. Also, please charge any additional fees or credit any overpayments to Deposit Account No. 50-0383.

Respectfully submitted,



Georgann S. Grunebach
Registration No. 33,179
Attorney for Appellant

Date: April 7, 2006

The DIRECTV Group, Inc.
RE / R08 / A109
2230 East Imperial Highway
P.O. Box 956
El Segundo, CA 90245-0956

Telephone: (310) 964-4615

CLAIMS APPENDIX

1. A communications system comprising:

a plurality of regional ground stations;

a plurality of satellites located in a elliptical sub-geosynchronous orbit with respect to the earth, said satellites operating in a service area in a synchronized manner to provide continuous coverage to said service area, said satellites generating a plurality of beams with widths that vary relative to position in the orbit to obtain a substantially uniform cell size covering said service area; and

a plurality of user terminals with the service area receiving communication signals from the satellite.

2. A system as recited in claim 1 wherein said ground station is coupled to one selected from the group consisting of an internet service provider, a broadcast television center and a corporate internet.

3. A communications system as recited in claim 1 wherein said uniform cells are substantially fixed within said service area.

4. A communications system as recited in claim 1 wherein said plurality of beams provide equal capacity density to said cell size.

5. A communications system as recited in claim 1 wherein said sub-geosynchronous orbit has a minimum elevation angle is greater than 10 degrees in said service area.

6. A communications system as recited in claim 1 wherein within said service area is a primary market area.

7. A communications system as recited in claim 1 wherein said plurality of satellites comprise a phased array to form said plurality of beams.

8. A communications system as recited in claim 1 wherein said first plurality of satellites are disabled when coextensive with a geostationary orbit.

9. A communications system as recited in claim 1 wherein said plurality comprises less than 9 satellites.

10. A communications system as recited in claim 1 wherein said plurality comprises 4 satellites.

11. A communications system as recited in claim 1 wherein said plurality comprises 5 satellites.

12. A communications system comprising:

a first plurality of satellites located in an elliptical sub-geosynchronous orbit with respect to the earth, said satellites operating in a service area in a synchronized manner to provide continuous coverage to said service area, said satellites generating a plurality of beams with widths that vary relative to position in the orbit to obtain a substantially uniform cell size covering said service area, said first plurality of satellites providing a first system capacity; and

a second plurality of satellites deployed after said first plurality of satellites, said second plurality of satellites providing a second system capacity greater than the first system capacity.

13. A communications system as recited in claim 12 wherein said uniform cells are substantially fixed within said service area.

14. A communications system as recited in claim 12 wherein said plurality of beams provide equal capacity density to said cell size.

15. A communications system as recited in claim 12 wherein said minimum elevation angle is greater than 10 degrees in said service area.

16. A communications system as recited in claim 12 wherein within said service area is a primary market area having an elevation greater than 30°.

17. A communications system as recited in claim 12 wherein said first plurality of satellites comprise a phase array to form said plurality of beams.

18. A communications system as recited in claim 12 wherein said satellites are disabled when coextensive with a geostationary orbit.

19. A communications system as recited in claim 12 wherein said first plurality comprises less than 9 satellites.

20. A communications system as recited in claim 12 wherein said first plurality comprises 4 satellites.

21. A communications system as recited in claim 12 wherein said first plurality comprises 5 satellites.

23. A communications system as recited in claim 12 wherein said orbit is an inclined eccentric sub-geosynchronous orbit.

25. A method of developing a customized satellite constellation comprising the steps of:

developing a first satellite constellation having a first set of satellites having regional coverage having a first service area, said first constellation comprises a first plurality of satellites located in a elliptical sub-geosynchronous orbit with respect to the earth, said satellites operating in a service area in a synchronized manner to provide continuous coverage to said service area, said satellites generating a plurality of beams with variable beam widths formed as a function of orbit position to obtain a substantially uniform cell size covering said service area;

launching a second set of satellites to form a second satellite constellation having primary market coverage in cooperation with said first set of satellites to have a second service area greater than said first service area.

26. A method as recited in claim 25 comprising launching a third set of satellites to form a third satellite constellation having optimized landmass coverage in cooperation with said first set of satellites and said second set of satellites having a third service area greater than said second service arca.

27. A method as recited in claim 27 wherein said first constellation, said second constellation and said third constellation comprise SGSO satellites.

28. A method as recited in claim 26 wherein said first set of satellites are non-interfering with GSO satellites.

29. A method as recited in claim 26 wherein said second set of satellites are non-interfering with GSO satellites.

30. A method as recited in claim 27 wherein said first plurality of satellites and said second set of satellites have active arcs sized to provide continuous coverage to said second service area.

31. A method as recited in claim 27 wherein said first plurality of satellites and said second set of satellites have active arcs sized to be non-interfering with GSO satellites.

32. A communications system comprising:

a plurality of regional ground stations;

a plurality of satellites located in a elliptical sub-geosynchronous orbit with respect to the earth, said satellites operating in a service area in a synchronized manner to provide continuous coverage to said service area, said satellites generating a plurality of beams with variable beam widths that vary as a function of orbital position to obtain a substantially uniform cell size covering said service area; and

a plurality of user terminals with the service area receiving communication signals from the satellite.

33. A communications system as recited in claim 32 wherein said plurality of satellites operate using a frequency of a GSO satellite.